

AD-A057 833

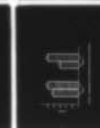
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER SAN D--ETC F/6 5/9  
EFFECTS OF ADMINISTRATIVE POLICY ON STUDENT PERFORMANCE.(U)  
JUL 78 M L ABRAMS, J SACHAR, C BUCKLEY

UNCLASSIFIED

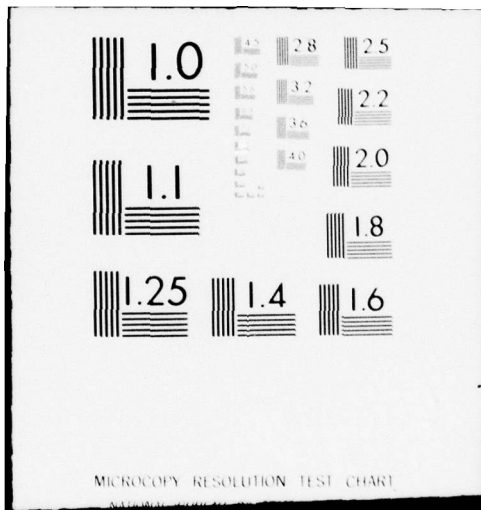
NPRDC-TR-78-25

NL

1 OF 1  
AD  
A057 833



END  
DATE  
FILMED  
10-78  
DDC



12 LEVEL II

ADA057833

AD No. \_\_\_\_\_  
DDC FILE COPY

npac

NPRDC TR 78-25

JULY 1978

EFFECTS OF ADMINISTRATIVE POLICY  
ON STUDENT PERFORMANCE

APPROVED FOR PUBLIC RELEASE;  
DISTRIBUTION UNLIMITED

DDC  
RECEIVED  
AUG 23 1978  
B

78 08 22 012

July 1978

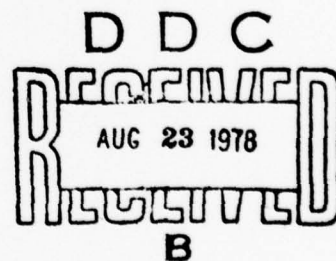
EFFECTS OF ADMINISTRATIVE POLICY  
ON STUDENT PERFORMANCE

Macy L. Abrams  
Jane Sachar  
Christine Buckley

Larry J. Brown  
Underway Replenishment School  
Naval Technical Training Center  
Treasure Island, California

Reviewed by  
J. J. McGrath

Approved by  
James J. Regan  
Technical Director



**DISTRIBUTION STATEMENT A**

Approved for public release;  
Distribution Unlimited

Navy Personnel Research and Development Center  
San Diego, California 92152



UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NPRDC-TR-78-25	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) EFFECTS OF ADMINISTRATIVE POLICY ON STUDENT PERFORMANCE.		5. TYPE OF REPORT & PERIOD COVERED Technical Report, June 1976-May 1977
6. AUTHOR(s) Macy/Abrams Jane/Sachar		7. CONTRACT OR GRANT NUMBER(s) F55522
8. PERFORMING ORGANIZATION NAME AND ADDRESS Navy Personnel Research and Development Center San Diego, California 92152 (Code 306)		9. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 62763N ZF55-522-002-03.02
10. CONTROLLING OFFICE NAME AND ADDRESS Navy Personnel Research and Development Center San Diego, California 92152 (Code 306)		11. REPORT DATE July 1978
12. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) 1233p.		13. NUMBER OF PAGES 32
		14. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) School administration Academic attrition Student-teacher interaction		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The effects of two types of school administrative policy on Navy student performance were investigated. They were (1) direct instructor-trainee interactions with a primary stress on military behaviors and a secondary stress on academic behaviors (M <sup>a</sup> ), and (2) indirect instructor-trainee interactions with the primary emphasis on academic behaviors and a secondary emphasis on military behaviors (A <sup>m</sup> ). <sup>17A</sup> Subjects were 151 students attending		

DD FORM 1 JAN 73 1473

EDITION OF 1 NOV 68 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

390 772

LB

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

a Navy Hydraulics course with three classes conducted under each policy. The A<sup>m</sup> policy treatment significantly reduced attrition and improved academic performance. It was suggested that the study be replicated in a different school setting or that the A<sup>m</sup> treatment be tried out in one or more schools. If the results support those of the study, it is recommended that the Navy implement this policy and provide administrators with a course in the procedures for establishing and maintaining the use of A<sup>m</sup> methods.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

# FOREWORD

The research was performed under Exploratory Development Task Area ZF55-522-002 (Methodology for Development and Evaluation of Navy Training Programs) and Work Unit Number ZF55-522-002-03.02 (Comprehensive Strategy for Reducing Attrition in Navy Technical Training Schools). It was initiated in response to requests from the Chief of Naval Technical Training.

Appreciation is expressed to the staff of the Underway Replenishment School, Treasure Island, who worked so diligently in this effort. Special appreciation is extended to LT Foley, MMCS Doria, ENCS Puckett, MMCS Mort, MMC Immamua, and MML Eschenko for their enthusiastic support and cooperation.

J. J. CLARKIN  
Commanding Officer

ADDRESS	
DTG	DATE
DOC	DATE
CLASSIFICATION	
REMARKS	
BY	
ESTIMATION/AVAILABILITY CODES	
DATE	AVAIL. CODE
SPECIAL	
A	

## SUMMARY

### Problem

High academic attrition rates continue to be of prime concern to the Navy in terms of higher training costs and the resulting shortages of critical fleet personnel. Numerous studies have been conducted on the effects of trainee characteristics, course content, and instructional delivery systems on attrition. However, since the attrition problem continues, it appears that research should be conducted on school administrative policy.

### Objective

The objective of this research was to investigate the effect of two types of school administrative policy on Navy student performance across experience levels. The two policies studied were (1) direct instructor-trainee interactions with a primary stress on military behaviors and a secondary stress on academic behaviors ( $M^a$ ), and (2) indirect instructor-trainee interactions with the primary emphasis on academic behaviors and a secondary emphasis on military behaviors ( $A^m$ ).

### Approach

Subjects were 151 students attending the Underway Replenishment Mechanical and Hydraulic Components Maintenance course conducted at the Naval Technical Training Center, Treasure Island, between 28 June 1976 and 25 February 1977. The two experimental conditions were administrative policy favoring the use of either  $M^a$  or  $A^m$  treatments. Three types of dependent variables--academic performance (attrition and scores obtained), military performance, and attitude changes--were measured during the first and third weeks of the 3-week course. The same course materials, schedules, and instructors were used under both experimental conditions. The  $M^a$  treatment was used for the first three classes; and the  $A^m$  treatment, for the final three classes. Prior to the onset of each condition, the administrator and instructors were given training in the respective conditions.

### Results

1. The attrition rate for  $A^m$  students was 1.4 percent, compared to 10.1 percent for  $M^a$  students.
2. Students' academic performance--for both theoretical and practical measures--was significantly improved under the  $A^m$  treatment.
3. A significantly higher proportion of  $M^a$  than  $A^m$  students committed infractions for the "hair" measure of military performance during the first week; however, both groups were performing at the desired military standards by the end of the course.
4. In end-of-course interviews,  $A^m$  students were considerably more positive about the course and the learning environment than the  $M^a$  students.



### Conclusions

It appears that Navy training attrition rates and training costs could be significantly reduced if school administrative policies favoring the use of the A<sup>m</sup> treatment were implemented.

### Recommendations

The study should ideally be replicated in a different school setting or the A<sup>m</sup> treatment should be tried experimentally in one or more schools. If the results support those of this study, it is recommended that the A<sup>m</sup> treatment become official Navy administrative policy. One possible approach to implementing this policy would be to develop a short course for school administrators that would provide (1) a step-by-step procedure for establishing and maintaining the use of A<sup>m</sup> teaching methods and (2) practice with those methods. The costs associated with the development and implementation of this course would be minimal compared with the current costs of attrition.



# CONTENTS

	Page
INTRODUCTION . . . . .	1
Problem . . . . .	1
Background . . . . .	1
Objective . . . . .	3
METHOD . . . . .	5
Course . . . . .	5
Subjects . . . . .	5
Procedure . . . . .	5
RESULTS . . . . .	9
Academic Performance . . . . .	9
Attrition Rates . . . . .	9
Academic Performance Scores . . . . .	11
Military Performance . . . . .	15
Attitude Changes . . . . .	15
DISCUSSION AND CONCLUSIONS . . . . .	17
RECOMMENDATIONS . . . . .	19
REFERENCES . . . . .	21
REFERENCE NOTES . . . . .	23
APPENDIX--ATTITUDE SURVEY QUESTIONNAIRE . . . . .	A-0
DISTRIBUTION LIST	

# LIST OF TABLES

	Page
1. Academic Attrition Rates for Selected Ratings in BE/E Schools, January-July 1976 . . . . .	4
2. Experimental Conditions that Varied According to Group . . . . .	7
3. Basic Test Battery Scores for M <sup>a</sup> and A <sup>m</sup> Groups . . . . .	9
4. Academic Performance Measures . . . . .	11

# LIST OF FIGURES

1. Attrition rates for the M <sup>a</sup> and A <sup>m</sup> groups . . . . .	10
2. Weekly test means for the M <sup>a</sup> and A <sup>m</sup> groups . . . . .	12
3. Biweekly progress test medians for M <sup>a</sup> and A <sup>m</sup> groups . . . . .	13
4. Performance test medians for M <sup>a</sup> and A <sup>m</sup> groups . . . . .	14

## INTRODUCTION

### Problem

In an endeavor to maximize fleet readiness, the Navy expends about 20 percent of its annual personnel investment for training (Battelle, Brown, Kruzic, Marshall, Moll, Paskert, & Radovic, 1973). Yet, academic attrition rates are often high, which results in major shortages in the manpower levels of technical ratings required in the fleet (Chief of Naval Technical Training (CNTECHTRA), Note 1). Further, the performance of many graduates is often deemed unsatisfactory. The Center for Naval Analyses (Lockman, 1975) estimates that, for fiscal year 1975, "the attrition cost could easily exceed 100 million dollars, and this would not take into account the costs of empty training seats and fleet billets" (p. 2). Therefore, not only the causes of conditions leading to academic attrition, but also the correction of such conditions, are major concerns of the Navy training community (Chief of Naval Education and Training (CNET), Note 2; CNTECHTRA, Note 3).

Some factors that may affect academic attrition include trainee characteristics, course content, instructional delivery systems, and school administrative policy. Considerable research has been conducted on the first three variables (e.g., Abrams & Wells, 1971; Brock, Wells, & Abrams, 1974; Thomas, E., 1969; Thomas, P., 1972; Fishburne & Mims, 1975), with varying degrees of success. However, since the attrition problem continues, it appears that research should also be conducted on the latter variable, administrative policy.

### Background

According to Navy School Administration (NAVPERS 10495, 1966), the basic purpose of educational administration is to constantly strive for "improved learning so as to provide the best trained manpower possible for the operating forces" (p. iv). The officer-in-charge of a Navy school (the administrator) serves as its educational leader, providing leadership, guidance, and appropriate training to the instructional staff members to stimulate their development as teachers. As such, the administrator must work with and guide the teaching staff in those teaching behaviors essential to accomplishing the school's goals. One approach to analyzing the effectiveness of the administrator, then, is to evaluate how teaching behaviors affect student performance.

In the public school sector, the relationship between teaching behaviors and student performance has been studied by observing teacher-student interactional behavior. In most of these studies, two contrasting teaching styles have been identified, commonly labelled as the indirect and direct methods.<sup>1</sup> The concept and findings of these studies consistently indicate that indirect styles or behaviors are usually associated with improvement in academic performance. Teachers using these behaviors tend to encourage student verbal participation by accepting and supporting their ideas and feelings, by praising

---

<sup>1</sup>Other labels assigned to these styles in various studies include (1) permission-directive, (2) integrative-dominative, and (3) inclusive-preclusive.

and encouraging their questions and responses, and by asking questions to stimulate their participation and interest in schoolwork. On the other hand, teachers using direct behaviors tend to restrict student verbal participation by expressing their own ideas, by giving orders, by criticizing student behavior in an attempt to change it, and by justifying their authority. These latter behaviors are usually considered essential to the effective management of military establishments, including school operation (e.g., CNTECHTRA, Note 4).

Results of some of the studies performed in the public school sector are provided below:

1. Amidon and Flanders (1961) experimentally controlled the teaching patterns by training a teacher to perform the appropriate behaviors in four experimental conditions--two using indirect methods; and two, direct. The teaching variable was manipulated during a 15-minute discussion presented by the teacher on basic concepts in geometry. Results showed that students in the indirect conditions learned considerably more than those in the direct conditions.
2. Flanders (1967) studied students in eighth-grade mathematics and seventh-grade social studies courses. Those assigned to classes where teachers used indirect methods achieved significantly more than those assigned to classes where teachers used direct methods. Before these students began the course and after they had completed it, they were surveyed to obtain their attitudes toward and perceptions of the teachers, class, and learning activities. Results showed that students who had teachers who used indirect methods had the most constructive and independent attitudes.
3. LaShier (Note 5) studied the interactional behaviors of 10 eighth-grade student teachers over a 6-week period. He computed ratios of indirect to direct behaviors for each teacher and found a significantly positive relationship between these ratios and student performance on a reading test.
4. Snider (Note 6) observed high school physics teachers over a 1-year period and, like LaShier, computed ratios of indirect to direct behaviors for each teacher. The academic achievement of their students was measured by the scores they obtained on three science tests during the year. In this study, neither direct nor indirect behavior was related to student achievement across all measures; however, students who had teachers who were more direct during lectures and who had smaller variations in their ratios of indirect vs. direct behaviors across various classroom activities performed significantly better than other students. This finding suggests that the consistency of a teacher's behavior may be just as important to student achievement as the type of interactional behavior used.

In summary, the results of the majority of these studies indicated that the use of indirect teaching behaviors, particularly the use of praise and encouragement, which is one aspect of indirect teaching, tended to be related to higher student test scores.

Because the military environment differs from the public school environment, the results of public school research cannot be uncritically generalized to Navy schools. There is no available Navy research pertaining to teacher-trainee interactions; however, there is some evidence concerning the effects of differing administrative policies.



For example, research dealing with the application of instructional design systems in the Navy (Rundquist, Brock, & Abrams, 1972) found that differences in school administrative policies might have a strong impact on student performance. However, the other Navy research previously cited looked at behaviors that teachers displayed independent of administrative policy; thus, it appears that future research should address the question of whether administrative policy, which specifies those teacher behaviors, can affect student performance.

A comparison of 1976 academic attrition rates for 5063 trainees in four ratings attending Basic Electricity and Electronics schools<sup>2</sup> at Great Lakes, San Diego, and Orlando provided additional evidence suggesting that administrative policies in Navy schools may affect performance and academic attrition. Trainee characteristics, course content, and instructional delivery systems were nearly identical across schools. However, as shown in Table 1, there were significant differences in attrition rates in three of the four ratings (e.g., for the GMC rating, attrition rates were 46, 32, and 14 percent at Great Lakes, San Diego, and Orlando respectively). Since the other variables were constant, the differences among attrition rates may have resulted from different administrative policies.

#### Objective

The objective of this research was to investigate the effects of school administrative policy on Navy student performance across experience levels. The two policies studied were (1) direct instructor-trainee interactions with a primary stress on military behaviors and a secondary stress on academic behaviors ( $M^d$ ), and (2) indirect instructor-trainee interactions with the primary emphasis on academic behaviors and a secondary emphasis on military behaviors ( $A^m$ ). It was hypothesized that an administrative policy requiring instructors to use the  $A^m$  treatment would result in superior academic performance and comparable military performance.

---

<sup>2</sup>Navy recruits in approximately 17 different ratings must pass through BE/E school before they can attend their respective "A" schools.



Table 1  
Academic Attrition Rates for Selected  
Ratings in BE/E Schools, January-July 1976

Rate	Great Lakes				San Diego				Orlando				t-Value			
	Input	Drop	%		Input	Drop	%		Input	Drop	%		GL vs. SD	GL vs. OR	SD vs. OR	
ET	806	71	8.8		360	29	8.1		585	11	1.9		.39	5.31*	4.43*	
FT	877	160	18.2		706	74	10.5		309	9	2.9		4.81*	6.95*	4.47*	
GMM	511	233	45.6		218	69	31.7		161	22	13.7		3.39*	7.42*	4.00*	
GMM	310	132	42.6		120	43	35.8		100	23	23.0		1.31	1.12	.66	

Note. Data extracted from monthly Basic Electricity and Electronics School Attrition Reports from above schools to Chief of Naval Technical Training (Code N312), Naval Air Station, Memphis.

\*p < .01

## METHOD

### Course

The course used for this study was the Underway Replenishment Mechanical and Hydraulic Components Maintenance Course (A551-0027), conducted at the Naval Technical Training Center, Treasure Island. Although A551-0027 is identified as a single course, it actually consists of two distinct segments. The first is a 3-week course for all trainees on Basic Hydraulics; and the second, a 2-week course on either the Denison, Western Gear, or Vickers winches for those requiring that instruction. This study was conducted in the Basic Hydraulics course, which provides the student with specific prerequisite skills and knowledge required to maintain, repair, and troubleshoot underway replenishment hydraulic systems. The course includes information on basic hydraulic principles, properties of hydraulic fluids, hydraulic components (e.g., accumulators, actuators, pumps, and valves), basic hydraulic winch transmissions, use of technical manuals, interpreting and designing schematics, and practical maintenance experience on hydraulic pumps, valves, actuators, and accumulators.

### Subjects

Subjects were 151 students attending the course between 28 June 1976 and 25 February 1977. The 80 students attending the three consecutive classes running from 28 June to 24 September 1976 were assigned to the M<sup>a</sup> Condition (stressing military requirements first, and academic requirements second); and the 71 students attending the three consecutive classes running from 15 November 1976 to 25 February 1977, to the A<sup>m</sup> Condition (stressing academic requirements first, and military requirements second). The M<sup>a</sup> group included 20 civilians, 3 chief petty officers, 12 first class petty officers, 9 second class petty officers, 11 third class petty officers, and 25 firemen/seamen. The A<sup>m</sup> group included 12 civilians, 1 chief warrant officer, 7 chief petty officers, 10 first class petty officers, 12 second class petty officers, 10 third class petty officers, and 19 firemen/seamen. The differences in group composition were beyond the researchers' control; they occurred as a function of how personnel are normally assigned to the school. However, in the previous classes held in FY76, which included 168 students, personnel classification was not significantly related to academic achievement.

### Procedure

The independent variable was the administrator's directions to the instructors to use either the A<sup>m</sup> or M<sup>a</sup> treatment. The dependent variables were academic performance, military performance, and attitudes, measured during the first and third weeks of the course.

Academic performance was measured by (1) attrition rates, (2) weekly written tests (40 multiple-choice items), (3) summed biweekly written progress tests (10 multiple-choice items per test), and (4) weekly performance tests. In the performance test given during the first week, the trainee had to assemble and disassemble the Vickers Vane Pump; he was graded on his

skill in disassembly and assembly and on whether the pump operated correctly when assembled. In the performance test given during the third week, the trainee had to design a schematic for a hydraulic system using a specified number of components performing designated operations; he was graded on the number of components used, their placement, and whether the system would work.

Military performance was measured several times per week by personnel inspections and barracks inspections. For the former, a dichotomous score was coded for each of the four measures--uniform, hair, shoes, and shave--indicating whether the student had committed any infractions in the first three and/or the last three personnel inspections. Civilians, the chief warrant officer, and the chief petty officers were exempt from personnel inspections.

Attitudes were measured by 13 survey items given before students began the class and after they completed it (see appendix). In addition, available Basic Test Battery scores were collected.

Before the experiment began, the school administrator and his staff met with the researchers and jointly determined the experimental conditions.

The conditions remaining constant for the M<sup>a</sup> and A<sup>m</sup> groups are listed below. Those that varied according to group are shown in Table 2.

1. Curriculum.

- a. Course content.
- b. Classroom schedule (hours).
- c. Textual materials.
- d. Handouts (e.g., on school policy and regulations).
- e. Homework.
- f. Tests.

2. Instructional delivery systems (e.g., lecture, lab).

3. Military and academic standards.

4. Instructors.

5. Staff organization.

6. Debriefing procedures.

7. Records.

- a. Results of barracks and personnel inspections and military action taken.
- b. Scores obtained on academic tests and remediation taken.
- c. Scores obtained on attitude survey questionnaires.
- d. Personnel data (e.g., BTB scores obtained).

Table 2

Experimental Conditions that Varied According to Group

Item	Procedure for M <sup>a</sup> Group	Procedure for A <sup>a</sup> Group
Opening Orientation		
Emphasis	Military requirements first, academic requirements second.	Academic requirements first, military requirements second.
Inspections		
Personnel	Formal muster in formation outside classroom.	Informal muster in classroom.
Barracks	Formal--several times weekly.	Informal--several times weekly.
Classroom Environment		
Initial greeting	Reward student for proper military appearance/action and formally admonish for infractions committed.	Show concern for individual academic progress; mention informally the obvious need to look and act militarily; discuss infractions privately.
Instructor/student interaction	Instructor to be addressed formally.	Instructor to be addressed informally.
Questions	Not encouraged; student must raise hand and wait to be called on. Both student questions and student answers to questions treated factually.	Involvement by all students encouraged; questions permitted without raising hand. Student always reinforced for any part of question answered correctly--recognized for whatever he did correctly.
Schedule	Adhere rigidly to schedule.	Make schedule sufficiently flexible to meet learning needs.
Tests and homework assignments	Papers returned; grades given; tests reviewed with minimum amount of discussion and advice to study weak areas.	Papers returned; grades given; tests reviewed thoroughly and students recognized for what they did well. Test results used as learning tool, with weaknesses treated in positive manner. Individual remediation recommended.
Rewards (e.g., Friday PM off)	Based on military excellence.	Based on academic excellence.
Staff Meetings/Direction		
Focus	Toward techniques for better adherence to military regulations.	Toward techniques to enhance/motivate student learning--"How can we reach so and so?"



For both M<sup>a</sup> and A<sup>m</sup> subjects, the primary concern was student performance, including both academic learning and military deportment. However, as shown in Table 2, the procedures used for attaining this performance varied considerably. For example, during the opening orientation, in which course conditions were established, the presentations differed in the manner in which topics were covered, in the emphasis placed on them, and in the amount of time spent on them. For the M<sup>a</sup> group, the presentation stressed military rules and regulations. Students were told what they were required to do and what they could not do. They were given a schedule of personnel and barracks inspections and told that their appearance would have to meet prescribed military regulations. With regard to academic requirements, they were given the criteria for a passing grade and told that they were expected to do well and that their instructors would help them if they got behind in their homework. All statements were delivered in a very direct fashion, emphasizing do's and do not's.

The orientation of the A<sup>m</sup> group was much more relaxed. The students were told that inspections would occur and that, since they were all adults, they knew what was expected of them. With regard to academic requirements, students were told that the major reason people dropped out or failed the course was because of a lack of interest; therefore, if they were interested in the course, they would pass. Finally, they were told that the instructors would be available to help with any course-related problems.

Table 2 also shows that the M<sup>a</sup> group operated in a more formal environment than the A<sup>m</sup> group. For example, when each class began, M<sup>a</sup> students were greeted either with praise for their military excellence or admonishment for infractions they had committed. Student questions were not encouraged, but both their questions and answers were treated factually. Conversely, A<sup>m</sup> students were greeted by comments expressing the instructor's concern for and desire to assist in their academic progress; any military infractions they had committed were always discussed privately during a break or after class. These students were urged to ask questions, and told that "there is no such thing as a dumb question." The instructor always responded positively to their questions, and students were always reinforced for any part of a question answered correctly.

As indicated previously, M<sup>a</sup> teaching patterns were used for the three consecutive classes running from 28 June to 24 September 1976; and A<sup>m</sup> teaching methods, for the three classes running from 15 November 1976 to 25 February 1977. Before the beginning of the experiment, the instructors were given a listing of the experimental conditions that were to remain constant for both groups and those that would vary (i.e., procedures used). Also, before commencing each teaching pattern, the administrator and the instructor were given intensive training in use of that pattern. Further, to ensure that the experiment was conducted as designed, a researcher interviewed all trainees upon course completion.



## RESULTS

There were three nonacademic drops--one M<sup>a</sup> subject and two A<sup>m</sup> subjects--during the course of the experiment. Thus, the final sample consisted of 79 M<sup>a</sup> subjects and 69 A<sup>m</sup> subjects. As shown in Table 3, there were no significant differences between the groups on the Basic Test Battery scores.

Table 3  
Basic Test Battery Scores for M<sup>a</sup> and A<sup>m</sup> Groups

Subtest	M <sup>a</sup> Group			A <sup>m</sup> Group			t-value
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
GCT	47	56.2	8.0	32	53.2	7.5	1.71
ARI	47	52.7	7.6	32	51.6	9.1	.56
MECH	47	54.2	6.8	32	51.9	6.3	1.52
SHOP	41	55.4	7.5	24	58.5	6.8	1.71

### Academic Performance

#### Attrition Rates

Figure 1 shows that the attrition rate for A<sup>m</sup> students (1.4%) was significantly lower than that for M<sup>a</sup> students (10.1%,  $t = 2.20$ ,  $p < .05$ ). The similarity of the attrition rates for M<sup>a</sup> and previous 1976 students (9.0%) shows that the introduction of the M<sup>a</sup> treatment did not artificially raise the attrition rate.

One objective of this study was to determine whether the experimental treatments had different effects on the attrition of experienced and inexperienced personnel. However, the sample sizes were too small to permit a meaningful comparison.

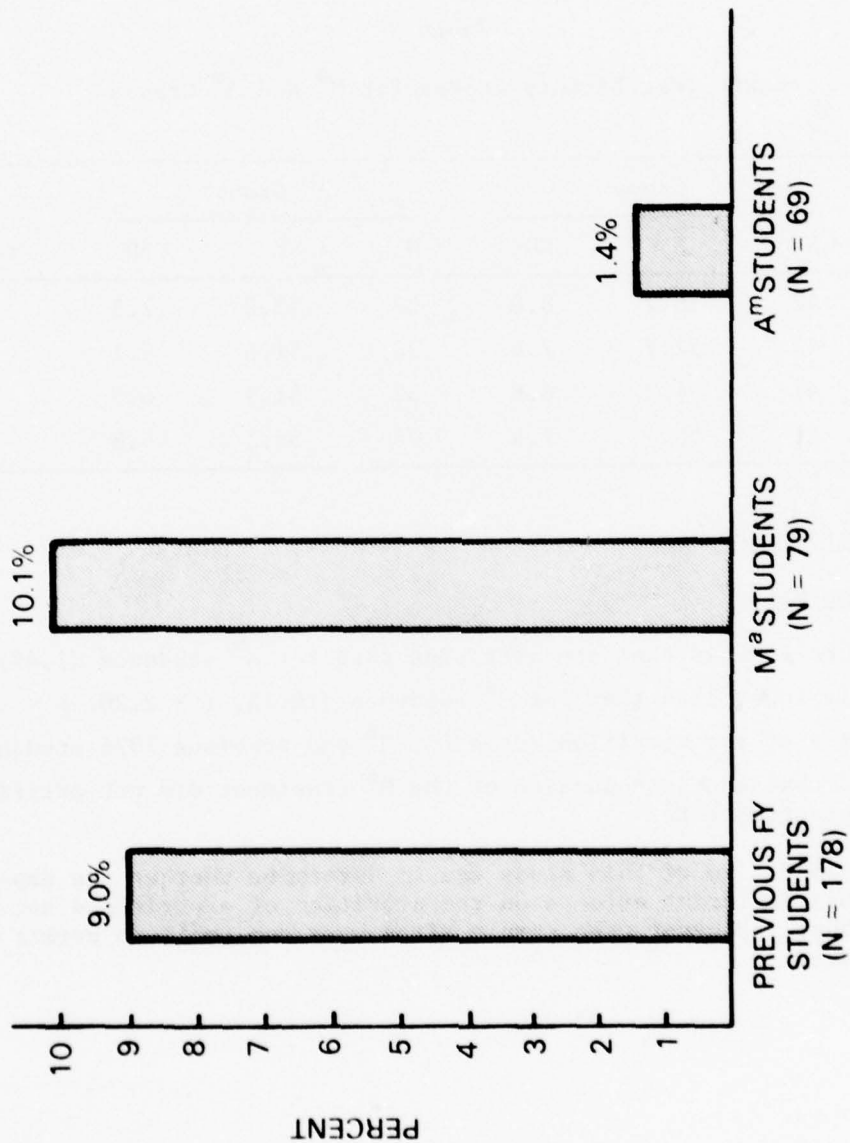


FIGURE 1. ATTRITION RATES FOR THE M<sup>a</sup> AND A<sup>m</sup> GROUPS.

### Academic Performance Scores

The means, medians, and standard deviations of the academic performance scores of the two groups are given in Table 4. The differences between groups are shown graphically in Figures 2, 3, and 4.

The mean scores obtained by the two groups on the weekly tests (see Figure 2) were analyzed using a two-tailed t-test. Results showed that the A<sup>m</sup> group performed significantly better than the M<sup>a</sup> group in both the first week ( $t = 3.07$ ,  $p < .01$ ) and the third week ( $t = 2.39$ ,  $p < .05$ ). Thus, the A<sup>m</sup> group was superior to the M<sup>a</sup> group in understanding the academic content of the course.

Table 4  
Academic Performance Measures

Variable	M <sup>a</sup> Group			A <sup>m</sup> Group		
	Mean Score	Median Score	SD	Mean Score	Median Score	SD
Weekly Test:						
Week 1	81.3	82.8	11.9	87.1	89.7	10.5
Week 3	72.4	70.4	10.0	76.8	78.5	11.6
Biweekly Progress Test:						
Week 1	17.5	18.1	2.3	16.8	17.0	2.2
Week 3	16.1	16.5	2.4	17.4	17.4	2.2
Performance Test:						
Week 1	28.0	29.3	3.3	29.7	30.0	1.2
Week 3	25.9	27.9	5.3	29.7	30.0	.6

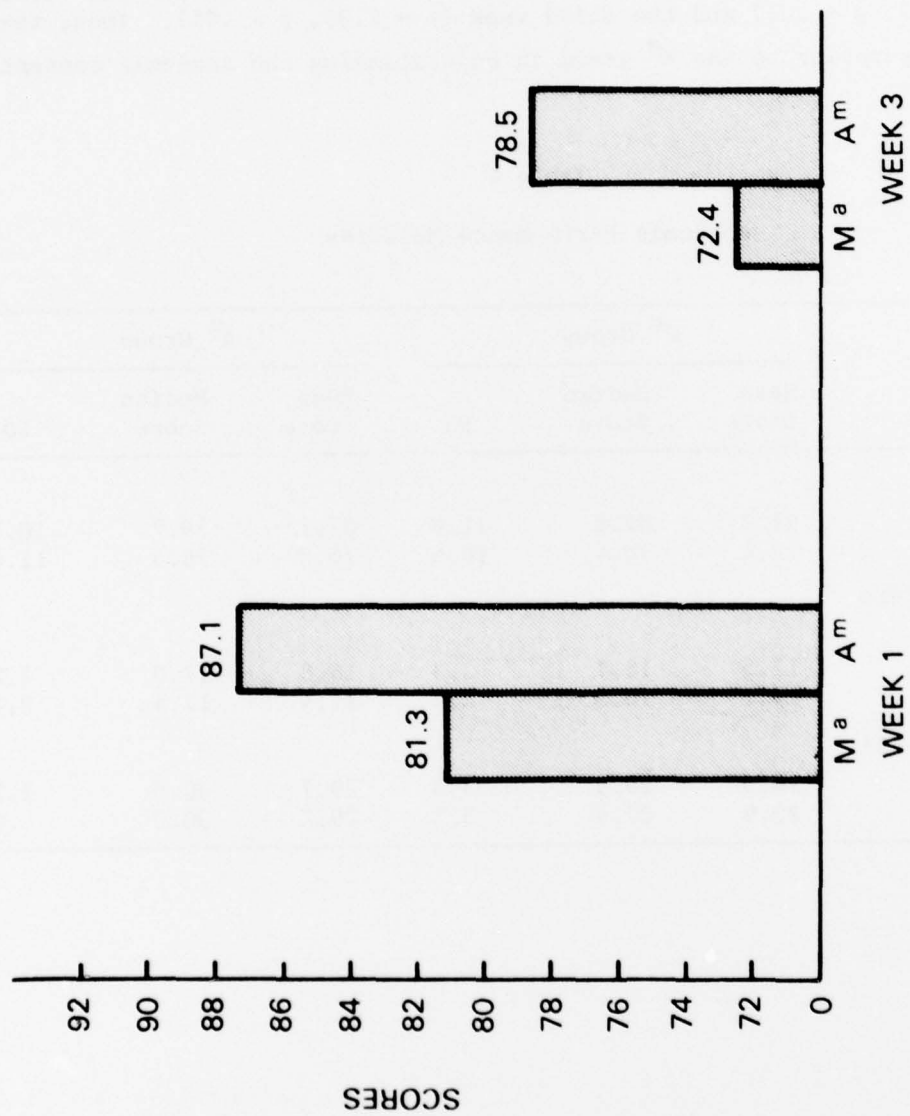


FIGURE 2. WEEKLY TEST MEANS FOR THE M<sup>a</sup> AND A<sup>m</sup> GROUPS

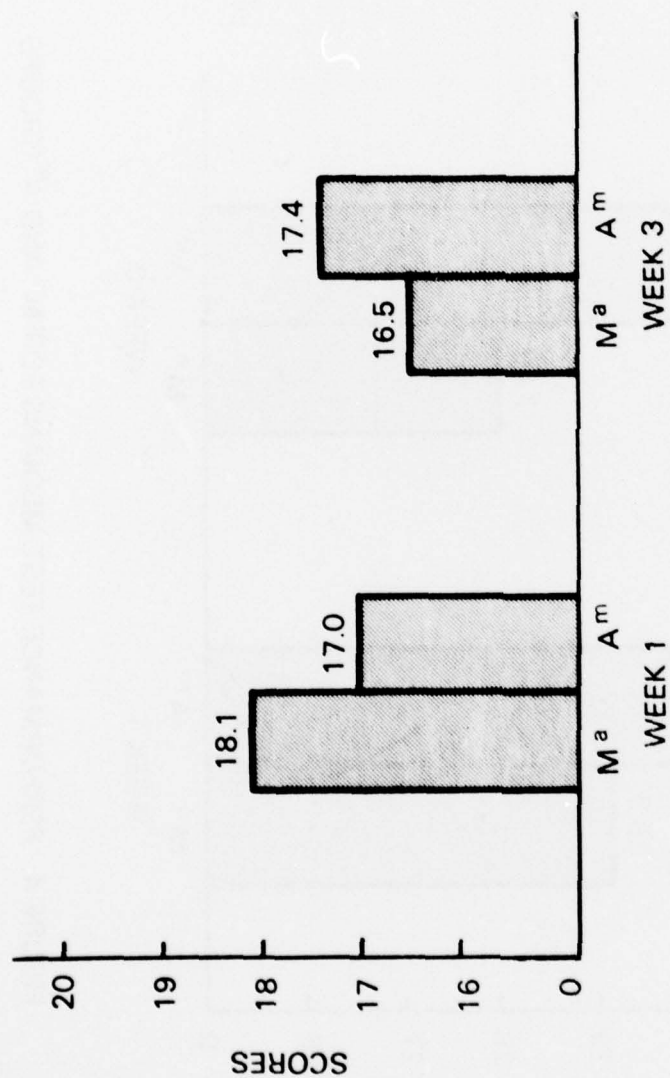


FIGURE 3. WEEKLY PROGRESS TEST MEDIAN FOR  $M^a$  AND  $A^m$  GROUPS



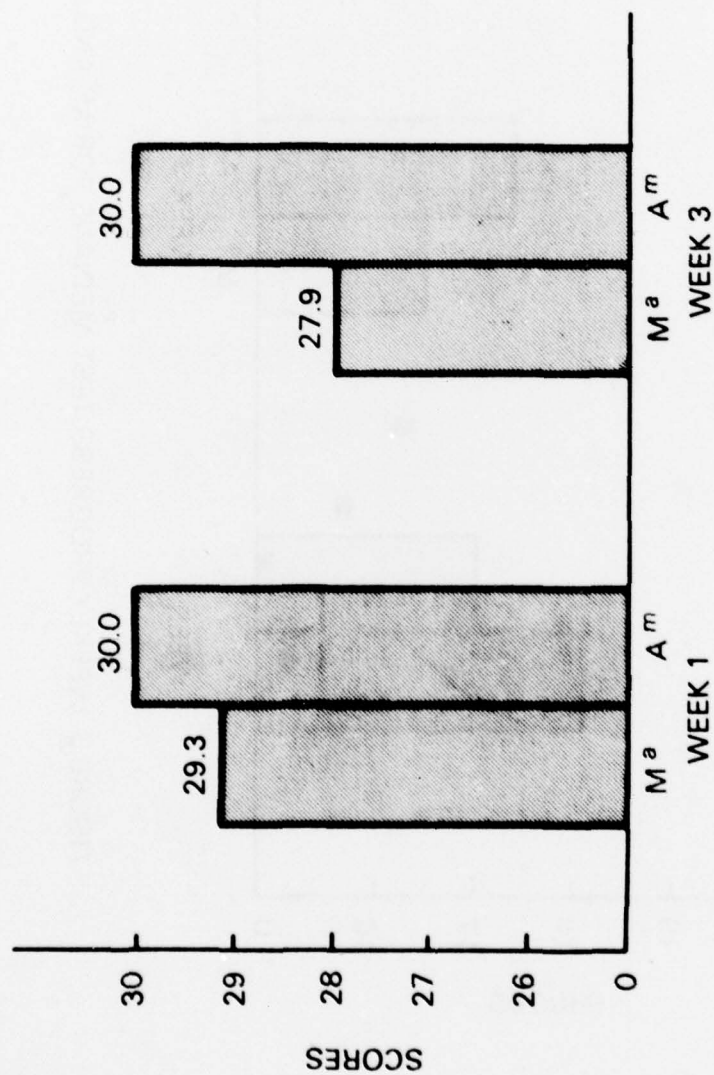


FIGURE 4. PERFORMANCE TEST MEDIAN FOR  $M^a$  AND  $A^m$  GROUPS

Since the distributions of scores on the biweekly progress tests (Figure 3) were skewed, a parametric test on means was inappropriate. Therefore a nonparametric test (Wilcoxon sum rank) was used to test group median differences. In the first week, the  $M^a$  group had a higher median score than the  $A^m$  group, but the difference was not statistically significant ( $W^* = 1.93$ ). In the third week, a reversal occurred, and the  $A^m$  group performed significantly better than the  $M^a$  group ( $W^* = 2.98$ ,  $p < .01$ ).

On the performance tests, the majority of students in the  $A^m$  group attained the maximum score of 30 points (see Figure 4), producing what is commonly called a "ceiling effect" on this dependent measure. Since a ceiling effect constrains the mean, differences between central-tendency measures cannot be assessed meaningfully. Therefore, t-tests were made at each score level (30, 29, 28, etc.) within the range attained by the  $A^m$  group, testing whether the proportion of subjects scoring at or above that level was the same for the two groups. Results showed that a significantly larger proportion of  $A^m$  students than  $M^a$  students scored at or above every level in both the first and third weeks of the course. Thus, the  $A^m$  group was superior to the  $M^a$  group in performing practical, hands-on, job-related tasks.

#### Military Performance

Results of the series of three personnel inspections held during the first week of training showed that a significantly larger proportion of  $M^a$  subjects than  $A^m$  subjects committed infractions for "hair." Few students in either group committed infractions for the other three measures (uniform, shoes, shave); and there were no significant differences on these variables between groups.

Results of the series of personnel inspections held during the third week showed that no  $M^a$  subjects and only three  $A^m$  subjects committed infractions in any of the measures. Thus, both groups were generally performing at the desired military standards by the end of the course.

Some barracks inspection results were contaminated by base orders requiring students to move to different barracks during the course of the experiment. Therefore, barracks inspection data could not be interpreted meaningfully. However, both groups appeared to be performing at an acceptable level throughout the experiment.

#### Attitude Changes

Student attitudes, as measured by the 13 survey items shown in the appendix, changed between the two administrations. However, the direction and magnitude of the changes on all 13 attitude variables were the same for the two treatment groups. In spite of these survey findings, the students in the two groups expressed quite different attitudes during end-of-course interviews.

During these interviews, A<sup>m</sup> subjects were considerably more positive about the course and the learning environment than the M<sup>a</sup> students. Typical comments from A<sup>m</sup> subjects included: "I really felt like studying," "Better than any other Navy school I've been to," and "We got so involved that we formed our own study groups in our off-hours." In contrast, M<sup>a</sup> subjects generally commented that the school, like other Navy schools, was too concerned with military regulations. The questionnaire items measured general attitudes toward the Navy; thus, the comments expressed in end-of-course interviews were apparently specific to the school and not to the Navy.

## DISCUSSION AND CONCLUSION

The basic purpose of this research was to investigate the effects of administrative policy on student performance, as characterized by two contrasting instructor-trainee interaction patterns. To ensure that any differences in student performance could be attributed to the interaction patterns, the same course materials, schedules, instructors, and trainee input were used under both experimental conditions. The results of the study support the hypotheses that the  $A^m$  treatment would result in superior academic performance and comparable military performance.

The combined effect of a reduced attrition rate and improved academic performance scores (at no measurable cost in military deportment) is of the utmost importance. Attrition occurs when students fail to achieve minimum academic scores. Thus, the simplest way to reduce attrition obviously would be to improve academic performance scores just enough to meet the minimum level. If that had resulted from using the  $A^m$  treatment in this study, the performance of students who otherwise would have failed would have improved sufficiently to pass, causing a lower mean performance score for the entire group. The fact that the  $A^m$  group had both significantly lower attrition and better academic performance scores in this experiment indicates that the  $A^m$  teaching method was indeed more successful in providing the fleet with a greater number of, as well as better trained, graduates.

While performance was generally superior for the  $A^m$  group, test results on two of the academic performance measures require further explanation. First, the  $A^m$  group scored slightly lower, although not significantly so, than the  $M^a$  group on the biweekly progress tests given in the first week. This could either be due to chance or because the tests were given early in the week, perhaps before the treatment conditions could affect student performance. Second, an inspection of the weekly test results indicated that performance declined for both groups during the third week. However, from discussions conducted with the instructors, it appears that the students were performing better during the third week, and that the decrement in test scores was essentially a function of the different levels of difficulty of the tests used.

The question is whether the results of this study can be generalized to other Navy schools, especially other technical schools. These schools usually differ on two broad dimensions that may greatly impact student performance: type of subject matter (theory vs. practical performance) and student input (fleet/experienced vs. recruit/inexperienced).

Regarding subject matter, theoretical knowledge was measured by the progress and weekly tests; and practical performance, by performance tests. Results showed that performance of  $A^m$  subjects was significantly better than that of  $M^a$  subjects on both types of subject matter.



The question of whether the A<sup>m</sup> method would be equally effective regardless of the experience level of the student input could not be answered in this study since the groups were too small in numbers to determine a possible interaction between experience level and treatment. However, even though statistical analyses were not warranted, the data were examined for any obvious trend. In general, there were no trends, and all experience levels seemed to have benefited from the A<sup>m</sup> treatment.

To summarize, in the A<sup>m</sup> condition, subjects as a whole performed significantly better on both types of subject matter. In addition, in research conducted in the public school sector, it has generally been found that A<sup>m</sup> teaching methods do result in better performance for students in various grade levels learning a variety of subjects. Thus, it would appear that the results of this study can be generalized to other Navy technical schools.

## RECOMMENDATIONS

School administrative policy favoring the  $A^m$  treatment was found to contribute to lower attrition rates and improved academic performance. Yet, current Navy schools are usually conducted using the  $M^a$  treatment. Because the administrators come from an environment stressing operational military behaviors, they may tend to use similar operational strategies in administering their schools. In addition, administrators are not provided with instruction on the procedures for implementing  $A^m$  teaching methods or, for that matter, any instruction on school administration. For this particular course, it took approximately 2 weeks to train the administrator and staff on the proper use of  $A^m$  teaching methods. The training was largely experiential, consisting of role playing and discussion of the behaviors identified in Table 2. It should be noted that the administrator and staff stated that the experiential nature of the training assisted them immeasurably in acquiring the ability to use  $A^m$  methods. Although the instructors had attended lectures on  $A^m$  methods in their instructor school, they were not able to use the concept without the role-playing experiences.

For these reasons, it is recommended that the study should be replicated in a different school setting or the  $A^m$  method should be tried in one or more schools. If results support those of this study, it is recommended that  $A^m$  teaching methods become official Navy administrative policy. One possible approach to implementing this policy would be to develop a short course for school administrators that would provide (1) a step-by-step procedure for establishing and maintaining the use of  $A^m$  teaching methods and (2) practice with those methods. The costs associated with the development and implementation of this course would be minimal compared with the current costs of attrition.

#### REFERENCES

- Abrams, M. L., & Wells, R. G. Development and evaluation of experimental core and magnetic particle liquid penetrant nondestructive testing training (NPTRL SRR 72-12). San Diego, CA: Naval Personnel and Training Research Laboratory, December 1971.
- Amidon, E., & Flanders, N. A. The effects of direct and indirect teacher influence on dependent-prone students learning geometry. Journal of Educational Psychology, 1961, 52, 286-291.
- Battelle, R. B., Brown, H. D., Kruzic, P. G., Marshall, T. H., Moll, D. K., Paskert, P. F., & Radovic, N. Analysis of some potential manpower policies for the all volunteer Navy (SRI Project 1897). Arlington, VA: Office of Naval Research, June 1973.
- Brock, J. F., Wells, R. G., & Abrams, M. L. Development and validation of an experimental radiograph reading training program (NPRDC Tech. Rep. 74-33). San Diego, CA: Navy Personnel Research and Development Center, June 1974. (AD-A0782 332)
- Bureau of Naval Personnel. Navy School Administration (NAVPERS 10496). Washington, D. C., 1966.
- Fishburne, R. P., & Mims, D. M. Formative evaluation of an experimental BE/E program (CNTT Report 9-75). Millington, TN: Chief of Naval Technical Training, March 1975.
- Flanders, N. A. Some relationships among teacher influence, pupil attitudes, and achievement. In Edmund J. Amidon & John B. Hough (Eds.), Interaction analysis, theory, research, and application. Reading, MS: Addison Wesley, 1967.
- Lockman, R. F. Chances of surviving the first year of service: A new technique for use in making recruiting policy and screening applicants for the Navy (CNS 1068). Arlington, VA: Center for Naval Analyses, November 1975.
- Rundquist, E. A., Brock, J. F., & Abrams, N. L. Application of instructional design systems in the Navy: Its implications for echelons of the training command (NPTRL Report). San Diego, CA: Naval Personnel and Training Research Laboratory, January 1972.
- Thomas, E. D. Navy recruit classification tests as predictors of performance in 87 class "A" enlisted schools (1964-1966) (NPRA SRR 69-14). San Diego, CA: U. S. Naval Personnel Research Activity, February 1969.
- Thomas, P. J. The relationship between Navy classification test scores and final school grade in 104 class "A" schools (NPTRL SRR 72-15). San Diego, CA: Naval Personnel and Training Research Laboratory, January 1972.

PRECEDING PAGE BLANK

#### REFERENCE NOTES

1. Chief of Naval Technical Training. Operational requirement: Development of standards for learning objective mastery within a Navy instructional program providing training to a large volume of personnel with differential skill classifications, 1975.
2. Chief of Naval Technical Training. Motivation of technical trainees, Message, date time group 110201Z, September 1976.
3. Chief of Naval Technical Training. Letter from Code 01612 over 3900 of 3 July 1975 to Commanding Officer, Navy Personnel Research and Development Center, San Diego, CA, Subj: Attrition Project; comments on
4. Chief of Naval Education and Training. Letter Code N-511 over 3900 of 15 January 1976 to Distribution List, Subj: NAVEDTRACOM research and development priorities.
5. LaShier, W. S. An analysis of certain aspects of the verbal behavior of student teachers of eighth grade students participating in a BSCS laboratory block. Paper read at National Science Teachers Association, New York, April 1966.
6. Snider, R. M. A project to study the nature of effective physics teaching. Unpublished doctoral dissertation, Cornell University, 1966.

PRECEDING PAGE BLANK



APPENDIX  
ATTITUDE SURVEY QUESTIONNAIRE

ATTITUDE SURVEY QUESTIONNAIRE

1. At the present time, what are your Navy service plans?
  - a. Serve my tour of duty and not reenlist.
  - b. I am undecided.
  - c. Reenlist or extend one or more times.
  - d. Stay on active duty until retirement.
2. How much do you like Navy life in general?
  - a. Like a lot.
  - b. Like a little.
  - c. Not sure.
  - d. Dislike a little.
  - e. Dislike a lot.
3. At present, how confident do you feel about handling your job duties in the Navy?
  - a. Confident, I can handle any demands put on me.
  - b. Confident, I can meet most demands.
  - c. I do not feel confident at all.
  - d. I do not think about these things very much.

What do you think of the following areas of Navy life? Make one choice from the list below (A-D) which tells what you think of the area mentioned. Circle your choice below.

4. The Navy's system for promoting men.
  - A. Does not apply or have not needed any.
  - B. I am satisfied with it.
  - C. I am dissatisfied with it.
  - D. No opinion.

For each statement (Items 16-24), make one choice from the list below (A-E) which tells what you think about that statement. Record your choice on the blank following the statement.

- A. Agree very much.
  - B. Agree a little.
  - C. Neither agree nor disagree.
  - D. Disagree a little.
  - E. Disagree very much.
5. The Navy hardly cares about how well each man in the Navy is getting along. \_\_\_\_\_
6. The Navy gives a man the chance to show how much he can do. \_\_\_\_\_

7. The Navy is such a large organization that a man gets to feel that no one cares about him. \_\_\_\_\_
8. The Navy makes sure to train each man to do a good job no matter what his assignment is. \_\_\_\_\_
9. The Navy cares more about rules and regulations than it does about training a man for his job. \_\_\_\_\_
10. I believe that being in the Navy has already done me a lot of good. \_\_\_\_\_
11. The Navy is really a place for people who like to be told what to do. \_\_\_\_\_
12. The Navy does everything it can to put men in jobs for which they are suited. \_\_\_\_\_
13. The Navy should not try to change the way a man thinks or what he does, as long as he does the job to which he has been assigned and does not get in other people's way. \_\_\_\_\_

# DISTRIBUTION LIST

Principal Deputy Assistant Secretary of the Navy (Manpower and Reserve Affairs)  
Chief of Naval Operations (OP-01B), (OP-01CR), (OP-964D), (OP-987H), (OP-991B)  
Chief of Naval Personnel (Pers-10c), (Pers-2B)  
Chief of Naval Material (NMAT 08T244)  
Chief of Naval Research (Code 450) (4)  
Chief of Information (OI-2252)  
Director of Navy Laboratories  
Commandant of the Marine Corps (Code MPI-20)  
Chief of Naval Education and Training (N-5), (N-2), (00A)  
Chief of Naval Technical Training (Code 016), (Code N3)  
Chief of Naval Education and Training Support  
Chief of Naval Education and Training Support (001A)  
Commander Training Command, U. S. Pacific Fleet  
Commander Training Command, U. S. Atlantic Fleet (Code N3A)  
Strategic System Project Office (SP-15)  
Commanding Officer, Fleet Combat Training Center, Pacific (Code 00E)  
Commanding Officer, Fleet Training Center, San Diego  
Commanding Officer, Fleet Anti-Submarine Warfare Training Center, Pacific  
Commanding Officer, Naval Education and Training Program Development Center (2)  
Commanding Officer, Naval Development and Training Center (Code 0120)  
Commanding Officer, Naval Damage Control Training Center  
Commanding Officer, Naval Education and Training Support Center, Pacific  
(Code N1B)  
Commanding Officer, Naval Health Sciences Education and Training Command  
(Code 2) (2)  
Commanding Officer, National Naval Dental Center (Library)  
Commanding Officer, Naval Training Equipment Center (Technical Library)  
Commanding Officer, Naval Technical Training Center, Treasure Island  
Commanding Officer, Underway Replenishment School, Naval Technical Training  
Center, Treasure Island  
Officer in Charge, Naval Education and Training Information Systems  
Activity, Memphis Detachment  
Officer in Charge, Naval Instructional Program Development Detachment,  
Great Lakes  
Director, Training Analysis and Evaluation Group (TAEG)  
Master Chief Petty Officer of the Force, U. S. Atlantic Fleet  
Master Chief Petty Officer of the Force, U. S. Pacific Fleet  
Master Chief Petty Officer of the Force, Naval Material Command (NMAT 00C)  
Master Chief Petty Officer of the Force, Naval Education and Training  
Command (Code 003)  
Personnel Research Division, Air Force Human Resources Laboratory (AFSC),  
Brooks Air Force Base  
Technical Library, Air Force Human Resources Laboratory (AFSC), Brooks  
Air Force Base  
CNET Liaison Office, Air Force Human Resources Laboratory,  
Williams Air Force Base  
Commandant, National Defense University, Industrial College of the  
Armed Forces  
Military Assistant for Training and Personnel Technology, Office of the  
Under Secretary of Defense for Research and Engineering  
Director, Defense Activity for Non-Traditional Education Support  
Secretary Treasurer, U. S. Naval Institute  
Science and Technology Division, Library of Congress  
Defense Documentation Center (12)